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PROJECTS SUPPORTED BY STRUCTURAL FUNDS OF EU REALIZED AT UNIVERSITY OF ŽILINA IN COOPERATION WITH AIR TRANSPORT DEPARTMENT AND FLIGHT TRAINING ORGANIZATION – AIR SCHOOL OF THE UNIVERSITY OF ŽILINA

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Summary: This paper is about projects of University of Žilina (especially projects which are realized at Air Transport Department in cooperation with Flight Training Organization (FTO) – Air School of the University of Žilina) and are supported and co-financed by structural funds of EU. At this moment the Air Transport Department deals with three projects: Implementation of science-research knowledge to the Air Transport -ITMS 26220220010, Centre of excellence for Air Transport -ITMS 26220120065, Q Brokerage centre of Air Transport for Transfer of Technology and knowledge into Transport and Transport Infrastructure -ITMS 26220220156.

Key words: sources of EU projects, Air Transport, , safety, Air Traffic, operation efficiency, environment, navigation equipment, radio communication equipment, transfer of knowledge

INTRODUCTION

The realisation of projects co-financed by the EU sources is very important for the development of universities in Slovakia. The development of science-research activities and related modernisation of the workplaces and their integration to the national and international research centres belongs to the prioritized goals of university. As a part of science-research activities, the orientation to the community highly appreciated basic and applied research, mainly in the field of educational activity is encouraged via national and international grant tasks and projects. Operational program Research and development supports increase of the competition ability of Slovak economics, international prestige of research in SR and its connection with the private sector contributes to the lowering of the regional disparity and to the production of the new job vacancies.

The aim is to increase the quality of the research working sites and support the excellent research with the emphasis to the area with the strategic importance for the further development of the economy and society. The emphasis is also considered for the transfer from the technologies and knowledge concerning the research institutions to the private sector. It's important to consider the continuity and consequence of particular projects that are realized in set work sites.

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Air transport department and Flight Training Organization (FTO) – Air School of the University of Žilina have long years of experiences in dealing with the science-research projects in the field of air traffic. They focus on increasing of quality and effectiveness of pilot's training, increasing of safety and quality of civil aviation as well as air traffic controlling.

There are three projects realised at the moment at these work places. Projects are supported by structural funds in operative program Research and development: Implementation of the science and research knowledge into the air transport ITMS 26220220010 Centre of excellence for air transport ITMS 26220120065 and Broker centre of air transport for technology transfer and knowledge into transport and transport infrastructure ITMS 26220220156. It also participates on the projects focused on modernisation and infrastructural support for University of Žilina and its workplaces: The modernisation of University of Žilina infrastructure with attention to the IKT ITMS 26250120021 and Support of University of Žilina infrastructure with the purpose of improvement of educational process ITMS 26250120046.

1. IMPLEMENTATION OF THE SCIENCE-RESEARCH KNOWLEDGE INTO THE AIR TRANSPORT

The main strategic aim of the project realized by Air transport department in cooperation with Flight Training Organization (FTO) – Air School of the University of Žilina, is to design the technological procedure with the aim of increasing effectiveness and safety of air traffic. The project supports the effort for increasing the science and technique participation on the whole development of Slovak republic with the focus on the more intensive involvement of science and technique in the solving of economic and social problems of Slovakia. The increase of science and technique participation on the country development will lead to the increase of Slovak republic contribution to the whole improvement of competition ability of EU.

The projects specifications

The aim of the project is the development of the monitoring and evaluating system for aircraft power units with the purpose of improvement flight safety and their energetic effectiveness. The project also covers the development of the monitoring and evaluating system for the condition of support equipment with the purpose of safety improvement of ground navigation and tracking systems.

The project is focused on investigation of the parameters of aircraft piston engine. The outcome of the project is the operational data that helps to formulate new operational procedures and increase flight safety thanks to more precise evaluation and identification of condition of aircraft piston engine.

For the purpose of the training, the aircraft Zlín type with the engines M332 and M337 are used in Flight Training Organization (FTO) – Air School of the University of Žilina. The temperature of the one cylinder head is measured for the control of the engine thermal condition. The temperature of the engine is supposed to vary in the set thermal range. Consequently the temperature of the lubricating oil is controlled. The temperature of lubricating oil is supposed to vary in the set thermal range too in normal operation.

Increased thermal loading could lead to the engine damage – failure type “piston jamming” or “burned piston”. Nevertheless, the investigation of the thermal state of the one cylinder head (cylinder Nr. 4), doesn't inform about the thermal state of the rest cylinders thus it doesn't prevent their possible failure.

For the increase of the flight safety and flight energetic effectiveness is necessary to use equipment for the more precise monitoring of the aircraft piston engine condition. The equipment that allows measurement and investigation of the engine thermal state by measuring of all pistons' head temperatures and measuring of all temperature values of the exhaust gas as well.

The design of the procedures and methodology of the engine regulation and their usage in the operation will increase flight safety and energetic flight effectiveness because crew will be better informed about the working condition of the aircraft piston engine.

The second strategic aim of the project is to ensure the development of the monitoring and evaluating system for the condition of support equipment with the purpose of safety improvement of ground navigation and tracking systems. Concerning the development of the alternative electric energy sources, it was found that location and operation of the windmills could negatively affects operation of the aviation communication, navigation and tracking devices. The impact of the windmills depends on many factors such as position, distance, sea level, terrain relief as well as on meteorological conditions (wind direction and wind speed), that affect the angle of direction and the frequency of rotor spinning. In present analysis of the windmill impact and evaluating of their localization are used general map materials that help to determine longitudinal profile of the terrain. Non-certified GPS stations are used for verifying of the location. The accuracy of used equipment requires increasing safety distance when installing windmills close to aviation ground equipment. This decreases the optimization of the windmill position concerning the terrain configuration and wind conditions.

It's absolutely necessary to ensure safety of aviation equipment on one hand, however is desirable to allow the development of the alternative sources of energy – windmills, on the other hand. Created system of the equipment enables more precise

diagnostics of suitable areas for location of windmills without any negative consequences for ground aviation equipment.

2. THE CENTRE OF EXCELLENCE FOR AIR TRANSPORT

The strategic aim of the project is to increase the quality of the Air transport department as a research workplace on the field of planning of the transport development, taking into account the consequences in economic and environmental area.

Specific aims of the project

One of the specific aims of the project is the laboratory construction for the flight verifying of the aviation support equipment and for increasing its safety. This will increase the quality of the research workplace. This flight laboratory is able to monitor the Slovak airspace with the vertical coverage in range from ground to FL 100 (approx. 3000m). The monitoring equipment is supposed to be able operate under more difficult meteorological conditions too, as well as the avionics equipment for precise landing including certification for CAT I, resp. CAT II with ability to proceed measurements during light icing. Minimal technical requirements for AeroLab 1 require the horizontal coverage min 600km, the time of continual measuring without interlanding min 4 hours, sensors and antennas for electromagnetic field measuring, common distribution panel, and electrical installation concerning distribution and connection network, installation of data collector.

Equipment for flight under IFR conditions is supposed to be installed on board according to the valid ICAO (SR) requirements.

The second specific aim of the project is the measurement of environmental impact of the air transportation. In consideration of the fact that there is not any similar system of obtaining the meteorological data from the research aircrafts in Slovak republic, the special flight laboratory of University of Žilina presents unique device for obtaining information especially concerning the cloudy formation (base and upper-level cloudiness, state of matter, visibility in particular cloud types), turbulence, icing and concentration of the environmental gases and short-waves and long-waves radiation as well.

Flight laboratory presents irreplaceable source of meteorological information within the airport area and equally along chosen flight route within whole flight era Bratislava FIR.

3. BROKER CENTRE OF AIR TRANSPORT FOR TRANSFER OF TECHNOLOGY AND KNOWLEDGE INTO TRANSPORT AND TRANSPORT INFRASTRUCTURE

The aim of the project is in accordance with the main aim of the call OPVaV-2010/2.2/06-SORO „The increase of the cooperation rate of the research-development institutions with the social and economic practice via transfer of knowledge and technology that contributes to economic grow and grow of whole Slovakia”. The mentioned project directly contributes to the performing of the main aim of the call whereas the partners from academic and private sphere will be involved.

The outcome of the realised research will be transferred into the practical conditions of private companies. They will support better utilization of the ICT thus the economical grow of particular Slovak regions.

The specific aims of the project

The first specific aim is to build competent centre of air transport in Slovak republic that will be focused on dealing with the tasks concerning application research using high-tech technologies. Application research will be realised via delivery form of solving tasks for small and medium companies, for wide range of companies related to the transport (companies offering services in existing transport infrastructure or producing companies and operations with interest I applicated research.

It's important to point out the effort for sustainability of young, educated people in central Europe region thanks to the transfer of knowledge potential of the universities and research institutions into the industry and the effort for supporting of permanent economic grow of Slovak regions.

The second specific aim is to develop broker centre for transfer of technologies and knowledge in transport with the purpose of developing the system of mutual informedness and interconnection of university environment, research organisations and private sector. The emphasis will be put on sustain of databases concerning research-development and educational activities at universities and research organisations at home and abroad. The aim is also the transfer of the knowledge and results of the research and development among the private companies with the involvement of the particular subjects, especially airports into the applicated research.

The effort of the project is also the guidance of the university and their employees towards the private sector and involvement of the students in the solving of practice thesis, dissertation works, students works and research projects.

The project put the emphasis on the reintegration of the Slovak science-research workers from prestigious foreign research organisations and companies into the common projects worked out at the University of Žilina. This project is realized in cooperation with the University of Žilina, Technical university in Košice, Airport company Žilina, a.s. and YMS, a.s..

CONCLUSION

The solving of the projects supported by structural funds of the EU is nowadays the necessity at the universities due to continue increasing demands for instrumental and information-communicational equipment of the working sites. These projects are the proofs of the fast grow of scientific findings that result to the requirements of experimental verifying knowledge and technologies using virtual reality. Their role is to create unique conditions at the workplaces thanks to also Slovak republic will be able to participate on the research of innovative technologies on the field of transportation. This fact brings advantages especially in perspective future, connecting findings, interdisciplinary and complexity of evaluating particular results of research tasks.

Intensive reconnecting of research and practice and formation of the partnerships at the universities level will lead to the increase of the quality of the science and research not only at the University of Žilina but of the Slovakia at all.

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